A METHOD OF COLLECTING AND TRANSPORTING CONE-NOSED BUGS.

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During investigations on the distribution of *Trypanosoma cruzi* Chagas, the causative agent of Chagas' disease, in southwestern United States, the writer has collected over 2000 *Triatoma* spp. (Hemiptera, Reduviidae) in the past eight years (Wood, 1941). Most of these insects were obtained from the nests of wood rats (*Neotoma* spp.) and have been carried alive to the laboratory from distances of a few to over 1000 miles.

The mounds of twigs, sticks, cow chips, cactus pads, and other building materials used by the rats were pulled down with a geologist's pick and raked over a level stretch of ground. In this way, the insects can be spotted easily as they move about on a twig, crawl out of the debris, or attempt to run for cover. The movements of *Triatoma* are very different from those of other insects found in the nests. After an initial quiescent period, they move to cover more or less rapidly depending upon the temperature. The slow, steady movement of most bugs toward some darkened region of the environment suggests a negative phototropism to daylight. Persistent search of pack rat nests in different localities has yielded the following species: *Triatoma protracta* (Uhler), *T. protracta woodi* Usinger, *T. rubida* (Uhler), *T. gerstaeckeri* (Stål), *T. heidemanni* Neiva, *T. indictiva* Neiva, *T. sanguisuga* Leconte, and *Paratriatoma hirsuta* Barber. Adult cone-nosed bugs were found mostly among the material immediately around the inner grass nest where the rat sleeps in the daytime but have been taken in any dark part of the nest. Nymphs, which are more abundant than adults in the nests, were found closer to the inner grass nest material of the rat. The smallest nymphs were either in the grass nest material or very close to it. From 451 wood rat nests, the average number collected for all species was 2.88 bugs per nest.

At first many insects died because of confinement in unsuitable containers. A light-weight container which would withstand moisture was needed. Glass jars used in the laboratory for cultures of *Triatoma* are too heavy to carry in large numbers, along with other equipment, either in a car or on one's person. Also the insects' need for moisture (or the coolness produced by it) proved thin cardboard boxes or drug cartons to be too fragile. This led to the use of a carton consisting of a heavy cardboard mailing tube two

inches in diameter and three inches deep with two side windows, tin bottom and tin screw-cap top (Fig. 1). These cartons were

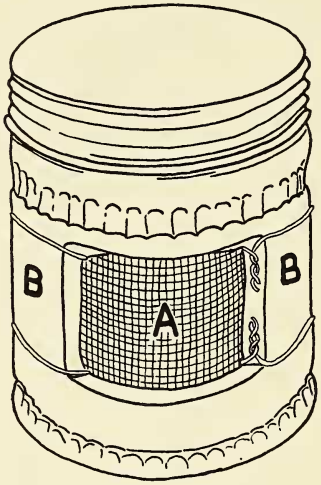

FIG. 1

purchased from the Gates Paper Co., Ltd., Los Angeles. The side windows (A) may be of variable size or shape and are easily made with a coping saw. The remaining strips of heavy cardboard (B) are ample support for the carton. The tube is lined with a cylinder of #40 brass screen or ordinary window screen (or both for added strength) securely fastened to the cardboard supports on each side by #24 annealed, tinned wire. The wire is inserted through the screen so as not to enlarge the holes in it and is tightened up enough to keep the screen in place without pulling it away from the carton wall. The wires are then pressed firmly against the screen-covered inner wall of the carton so as to follow its curvature. The approximate cost of materials per hundred cartons was 11 cents each.

Disadvantages of this container are that the tin heats up if the cartons are left in the sun, and the metal will rust in prolonged contact with moisture.

Advantages of this container are that it is light in weight, compact, sturdy, well ventilated, and water resistant. Because of the wide mouth, insects can be put in or removed easily with forceps. The screen windows make the contents visible without removing the cap. The rough inner lining offers a clinging surface, minimizing damage to the insects in transit, and the fine screen confines

eggs, nymphs or larvae. The small size makes it easily transportable and affords use of separate cartons for each locality. The tin screw-cap lid is not easily dislodged and ink notations can be made upon it and later rubbed off. For absorbing fecal material of *Triatoma,* double paper toweling discs to cover the bottom and an upright accordian-pleated piece of toweling are placed in each carton.

Loss of bugs in transit during extremely hot, summer weather is reduced if the cartons are placed in a hardware cloth basket and covered with wet cloths.

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METHODS OF COLLECTING AND MARKING LARGE NUMBERS OF BEETLES.

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During the summer of 1940 I had the opportunity to study some of the habits of the common milkweed beetle, *Tetraopes tetrophthalmus* (Forst.). In the course of this study I found it desirable to collect large numbers of the adult beetles in the field, bring them into the laboratory, mark them and return them to the same patch of milkweed.

In collecting a large number of these insects I soon learned that it was disastrous, both to my experiment and to the beetles, to confine a large number of active adults in too small a space, for they vigorously attacked each other with their mandibles and many suffered the loss of legs and antennae. To prevent injury of this nature two procedures were followed: (1) Overcrowded conditions were avoided by placing not more than ten beetles in each of several pint fruit jars containing strips of towel paper. This method proved to be rather cumbersome and awkward, but the results were very satisfactory. (2) The beetles were cooled to such a point that they became inactive. A thermos bottle was filled with ice and water after which a large test tube, the same length as the interior of the